Artistry in Sound

ONKYO

P-388F

Stereo Pre Amplifier

ONKYO Integra

Instruction Manual

- *Congratulations on your purchase of the ONKYO P-388F stereo pre amplifier.*
- *Please read this manual thoroughly before making connections and turning power on.*
- *Follow these instructions to obtain optimum performance and maximum listening enjoyment from your new P-388F. Please retain this manual for future reference.*

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Features

- **Totally Balanced Amplifier Configuration**
  As is often the case in components designed for professional use, the P-388F features a totally balanced construction, with two separate lines to carry the non-inverted and inverted signal. The big advantage of this design is the elimination of noise induced during the transmission process, plus the reduction of distortion that may arise from the amplifier itself.
- **Independent Ultra Low Impedance Power Supplies for the Four Principal Circuit Blocks**
  The left and right channel flat amplifiars, MM phono equalizer and MC phono equalizer circuit blocks are each powered by separate power supplies, each of which has ultralow impedance regulators to eliminate interference that could degrade signal purity.
- **Discrete MM and MC Phono Equalizers**
  The P-388F features two separate phono equalizer amps, giving an ample performance margin for each. Also, the number of switching points along the signal route are markedly reduced. Combined, these enhancements allow the equalization characteristics of each source to be optimized.
- **Simple Construction with isolated Audio Signal, Digital Control Circuit and Power Supply Blocks**
  The chassis is divided into three separate compartments for the audio signal, digital control circuit and power supply blocks. This example of ONKYO's "simple is best" design philosophy helps to prevent mutual interference and enhances signal purity.
- **High Quality Input Selector**
  ONKYO's exclusive computer controlled mechanical selectors switch the Input signal. They are free of nonlinear distortion that conventional relays and electronic switches are prone to, while providing the utmost in operating convenience. An ONKYO RI compatible ramote control is included.
- **Ultralow Magnetic Leakage AEI Power Transformers for Flat Amplifiers and Phono Equalizer Amplifiers**
- **Motor Driven, Detented Master Volume Control Knob**
- **Multi-Position REC Selector**
- **Independent Left and Right Channel Output Attenuators**
- **XLR Type Input and Output Terminals**
- **Machine-Crafted (not molded) Gold-Plated Pin Jacks**
- **Circuit Boards with 70μm Thick Copper foil (twice the normal thickness)**
- **First-Class Audio Specification Electronic Parts Throughout**

CAUTION:

"TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL."

- The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

- The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

"WARNING"

"TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE."

- For models having power cords with a polarized plug.

CAUTION: TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.

- Sur les modèles dont la fiche est polarisée.

ATTENTION: POUR EVITER LES CHOCS ELECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQU AU FOND.

Important safeguards

Observe the following precautions to obtain troublefree performance for many years.

1. **Read Instructions** – All the safety and operating instructions should be read before the appliance is operated.
2. **Retain Instructions** – The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** – All warnings on the appliance and in the operating instructions should be adhered to.
4. **Follow Instructions** – All operating and use instructions should be followed.
5. **Water and Moisture** – The appliance should not be used near water - for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, and the like.
6. **Carts and Stands** – The appliance should be used only with a cart or stand that is recommended by the manufacturer.

6A. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

PORTABLE CART WARNING

S3125A

7. **Wall or Ceiling Mounting** – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. **Ventilation** – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. **Heat** – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. **Power Sources** – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. **Polarization** – If the appliance is provided a polarized plug having on blade wider than the other, please read the following information; The polarization of the plug is a safety feature. The polarized plug will only fit the outlet one way. If the plug does not fit fully into the outlet, try reversing it. If there is still trouble, the user should seek the services of a qualified electrician. Under no circumstances should the user attempt to defeat the polarization of the plug.
12. **Power-Cord Protection** – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. **Cleaning** – The appliance should be cleaned only as recommended by the manufacturer.
14. **Nonuse Periods** – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
15. **Object and Liquid Entry** – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
16. **Damage Requiring Service** – The appliance should be serviced by qualified service personnel when:
    A. The power-supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the appliance; or
    C. The appliance has been exposed to rain; or
    D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
    E. The appliance has been dropped, or the enclosure damaged.
17. **Servicing** – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

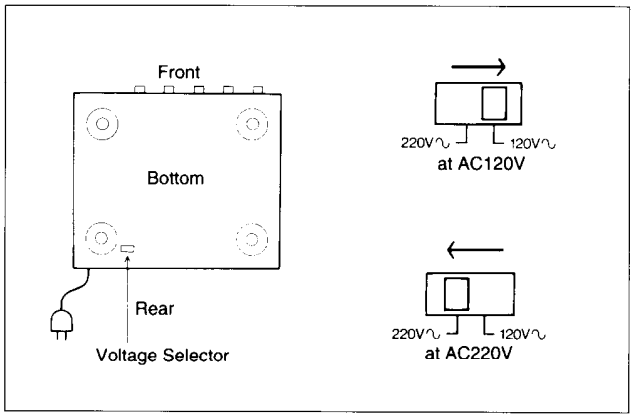
Precautions

1. **Warranty Card**
   The serial number is written on the rear panel of this unit. Copy the serial number and model number onto your warranty card and keep it in a safe place.
2. **Recording Copyright**
   Recording of copyrighted material for other than personal use is illegal without permission of the copyright holder.
3. **AC Fuse**
   The fuse is located inside the chassis and is not user serviceable. If power does not come on, contact your ONKYO service center.
4. **Care**
   From time to time you should wipe off the front and rear panels and the cabinet with a soft cloth. For heavier dirt, dampen a soft cloth in a weak solution of mild detergent and water or a mild ammonia cleaner, wring it out dry, and wipe off the dirt. Following this, dry immediately with a clean cloth. Do not use rough material, thinners, alcohol or other chemical solvents or cloths since these could damage the finish or remove the panel lettering.
5. **Power**
   WARNING
   BEFORE PLUGGING IN THE UNIT, CHECK ONCE AGAIN THAT THE UNIT CAN BE USED WITH THE LOCAL POWER SUPPLY. READ THE FOLLOWING SECTION CAREFULLY.

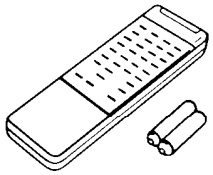
- Some models are designed for use only with the power supply voltage of the region where they are sold.

USA & Canadian models:	AC120V, 60Hz
Worldwide model:	AC 120V and 220 V switchable, 50/60Hz

- **Voltage Selector (Bottom)**
  Worldwide models are equipped with a voltage selector to conform with local power supplies. Be sure to set this switch to match the voltage of the power supply in your area before plugging in the unit. The voltage is changed by inserting a screw driver into the groove of the switch, and moving the switch from the right or left.Confirm that the switch has been moved all the way to the right or left before plugging in the unit. Models without a voltage selector can only be used in areas where the power supply is the same as that of the unit.



Supplied Accessories

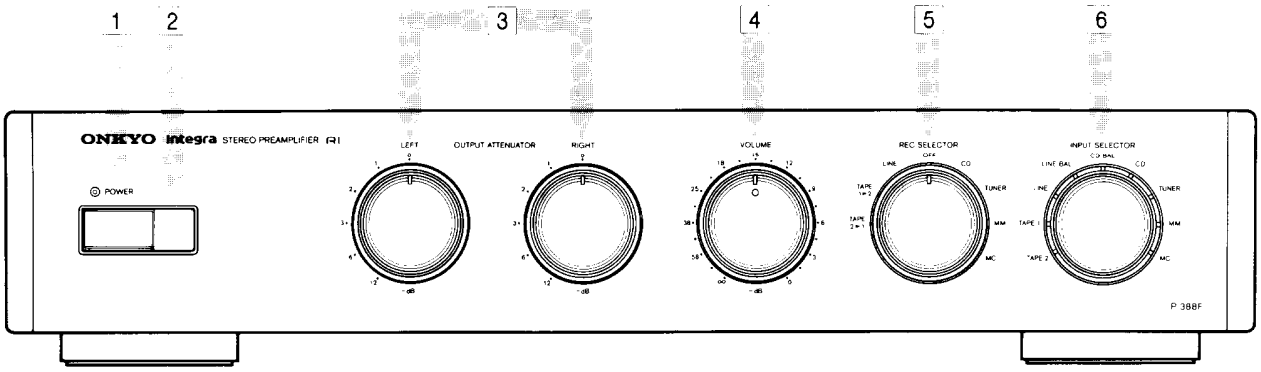


RI remote control cable x 1
(RI : Remote Interactive)

Remote control transmitter x 1
Battery x 2

Front and rear panel facilities

Front panel



1 **Power Switch (POWER) and Indicator**
Press the power switch to turn the power on, and the indicator will light. Press it again, and the power will be turned off. For 5 seconds after the power is turned on, muting will prevent the signal from being output, until the internal circuit works properly.

2 **Remote Control Sensor**
This receives signals sent from RC-235S remote control transmitter.

3 **Output Attenuator Switch (OUTPUT ATTENUATOR LEFT/RIGHT)**
This switch adjusts the output level of the output terminal. Also use it for L and R level adjustment, since left and right are independent of each other. Set the attenuate amount to one of these 6 values: 0, –1, –2, –3, –6 and –12 (dB). Normal setting is 0.

4 **Volume Control Knob (VOLUME)**
This controls volume. Turning it clockwise increases volume. When controlling with the remote control transmitter, pressing "UP" or "DOWN" increases or decreases volume respectively.

5 **Rec Selector Switch (REC SELECTOR)**
This switch selects the recording source. Output signal of TAPE-1 and TAPE-2 REC terminal are switched.
MC ..... Select this to record the record player connected to the PHONO MC terminal.
MM ..... Select this to record the record player connected to thePHONO MM terminal.
TUNER ... Select this to record the source connected to the TUNER terminal.
CD ..... Select this to record the source connected to the CD terminal.
OFF ..... Select this to not record or dub.
LINE ..... Select this to record the source connected to the LINE terminal.
TAPE 1►2 .. Select this to dub from TAPE-1 to TAPE-2.
TAPE 2►1 .. Select this to dub from TAPE-2 to TAPE-1.

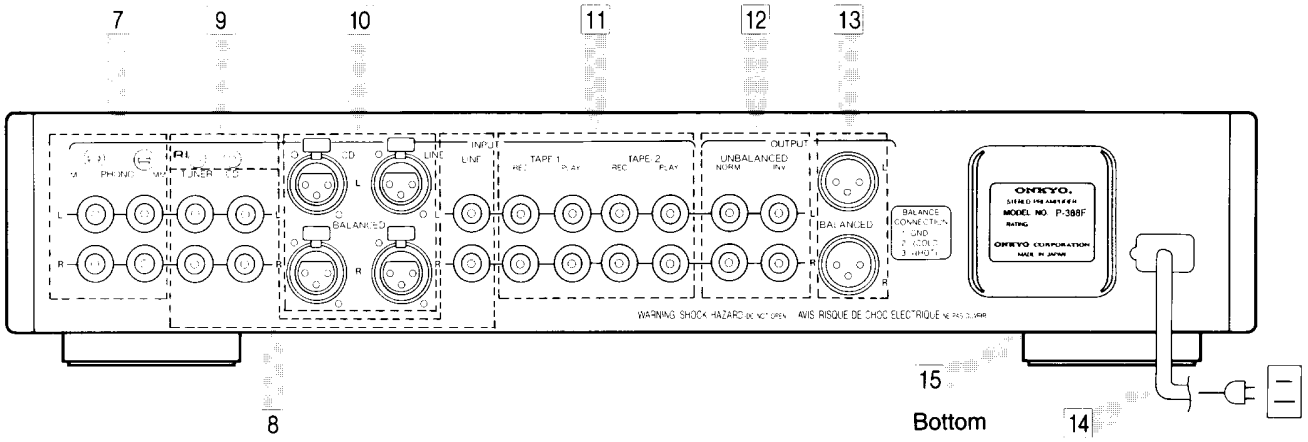
✻ Recording or dubbing can be performed regardless of the input selector's setting.

✻ A source connected to the BALANCED terminal cannot be recorded.

6 **Input Selector Switch and Indicators (INPUT SELECTOR)**
This switch is used to select the desired program source. The switch can be turned in either direction without end stops. An indicator lights to show which program has been selected. The switch is also able to be switched directly using the Input Selector buttons on the remote control transmitter.

- Make sure that the device of the selected source is connected to the appropriate terminal.

Rear panel



7 **Record Player Input Terminal (PHONO MM • MC)**
This terminal connects the record player. Make a selection in accordance with the cartridge to be used.
MM ..... Connect to this terminal when using a MM type cartridge.
MC ..... Connect to this terminal when using a MC type cartridge.
When using a step-up transformer or head amplifier, connect to the MM terminal, even when using a MC type cartridge.

✻ A short pin is inserted to this terminal before shipment from the factory. To use this terminal, remove the short pin and store it, or insert it to another input terminal. Do not insert it into the output terminal or TAPE REC terminal. Doing so may terminate sound production or cause abnormal operation.

8 **TUNER, CD and LINE Input Terminals**
This terminal connects the CD player, tuner, etc.

9 **Remote Control Jacks**
The remote control jacks are used to connect ONKYO products bearing the "RI" mark via the accessory remote control cable. When this unit is connected with ONKYO CD players or cassette decks bearing the "RI" mark, it can also be controlled by the remote control transmitter RC-235S. (Refer to page 7.)

10 **Balance Input Terminal (BALANCED CD/LINE)**
This terminal connects devices with balance output, such as the CD player. This terminal is equivalent to XLR-3-31.
Pin polarity 1 : GND
2 : – (COLD)
3 : + (HOT)

11 **Tape Deck Connecting Terminal (TAPE-1 PLAY/REC, TAPE-2 PLAY/REC)**
The unit can connect two tape decks.

12 **Unbalance Output Terminal (OUTPUT UNBALANCED NORM/INV)**
NORM .... Outputs the same phase signal in response to the input signal
INV ..... Outputs the reverse phase signal in response to the input signal.

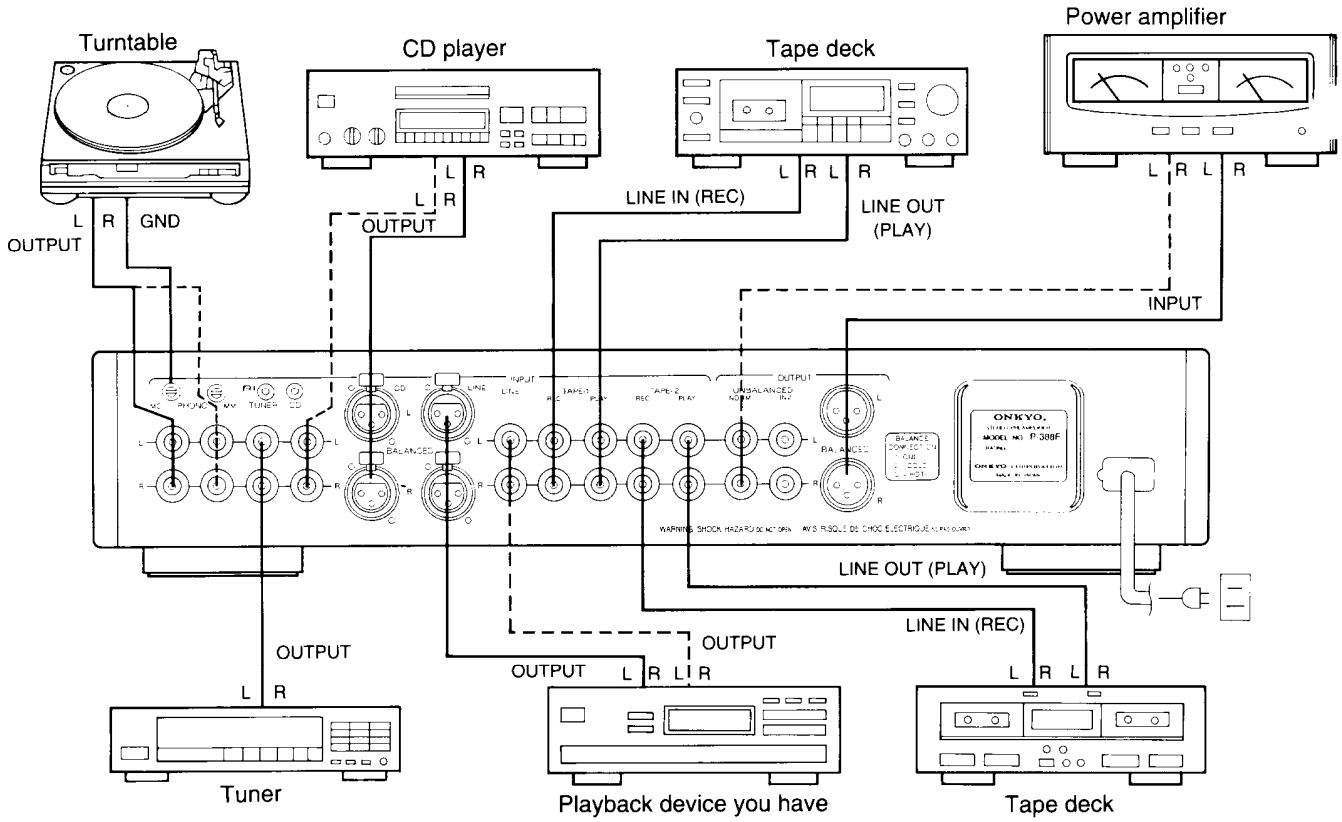
✻ The output impedance is 100Ω. Normally, it is connected to the amplifier by using the NORM side.

13 **Balance Output Terminal (OUTPUT BALANCED NORM/INV)**
The output impedance is 200Ω. This terminal is equivalent to XLR-3-32. Suitable connectors are XLR-3-11C equivalent products.
Pin polarity 1 : GND
2 : – (COLD)
3 : + (HOT)

14 **Power Supply Cord.**

15 **Voltage Selector (Bottom)**
This is provided only for worldwide models.
For details, see page 3.

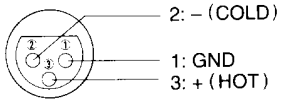
System connections



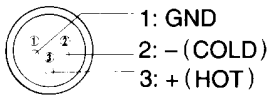
How to use XLR type connector

- Before connecting or disconnecting the input terminal, make sure that you turn the power off, in order to avoid damage to the speakers.

Input terminal

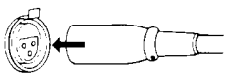


Output terminal



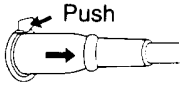
Input terminal

① Connecting the input terminal



Match the pins and insert the terminal until you hear a "click". Ensure that it is secure by gently pulling it.

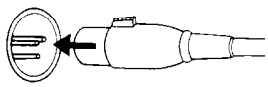
② Disconnecting the input terminal



Pull out the connection cord while holding down the lever.

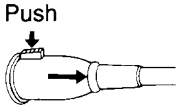
Output terminal

① Connecting the output terminal



Match the pins and insert the terminal until you hear a "click". Ensure that it is secure by gently pulling it.

② Disconnecting the output terminal



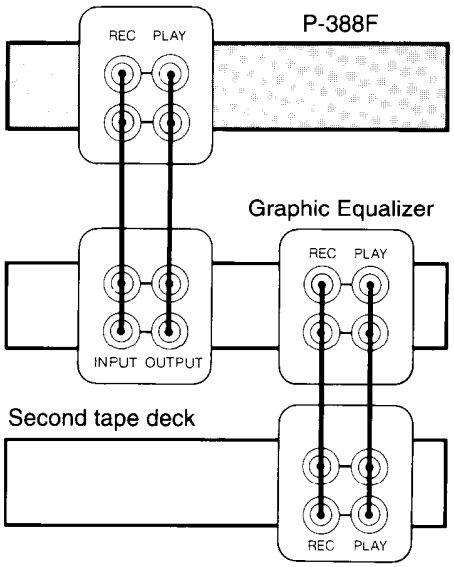
Pull out the cord (in the direction indicated by the arrow) while holding down the connection cord button.

General

- Do not plug in the power cord until all connections have been made.
- On each pair of input or output jacks, the lower jack (marked R) corresponds to the right channel, and the upper jack (marked L) to the left channel. When jacks on other equipment or connection cables are color-coded, the color red usually corresponds to the right channel (Red = Right).
- This unit's unbalance output terminal outputs the balance output terminal signal as it is. For that reason, the volume during unbalance output is small (1/2), like 6dB, compared to its level during balance output.
- If the power amplifier is connected to the balance output terminal, do not connect another device to the unbalance output terminal. Doing so may cause the balance output signal to become unbalanced, and the unit will not perform to its full capability.
- Do not insert the short pin into the unbalance output terminal. Doing so may cause malfunctions, such as no output production from the balance output terminal.

Connecting with the graphic equalizer

Connect this unit to the graphic equalizer by using the TAPE-1 or TAPE-2 terminal.

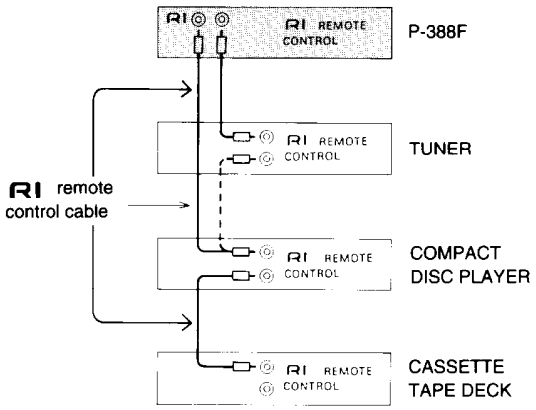


NOTE:

It is impossible to equalize performance of the device connected to the balance input terminal (BALANCED CD/ LINE).

Connections for Remote Control (REMOTE CONTROL)

- The right and left or the upper and lower RI remote control jacks have the same function.
- A power amplifier, tuner, cassette tape deck, and compact disc player that have the ONKYO RI mark can be operated, using the accessory remote control transmitter. (RI : Remote Interactive)



An RI remote control cable equipped with a 1/8" (3.5mm) diameter miniature two-conductor phone plug is attached to the P-388F and to any tuner, or compact disc player, with the RI mark.

To use an ONKYO compact disc player and cassette tape deck and tuner with the RI mark, insert the accessory remote control cable plug into the REMOTE CONTROL jacks. As far as connecting sequence is concerned, it doesn't matter whether the cable is connected from the P-388F to tuner or to the cassette tape deck or to the compact disc player. The remote control transmitter is operated by facing it towards the remote control sensor of the P-388F.

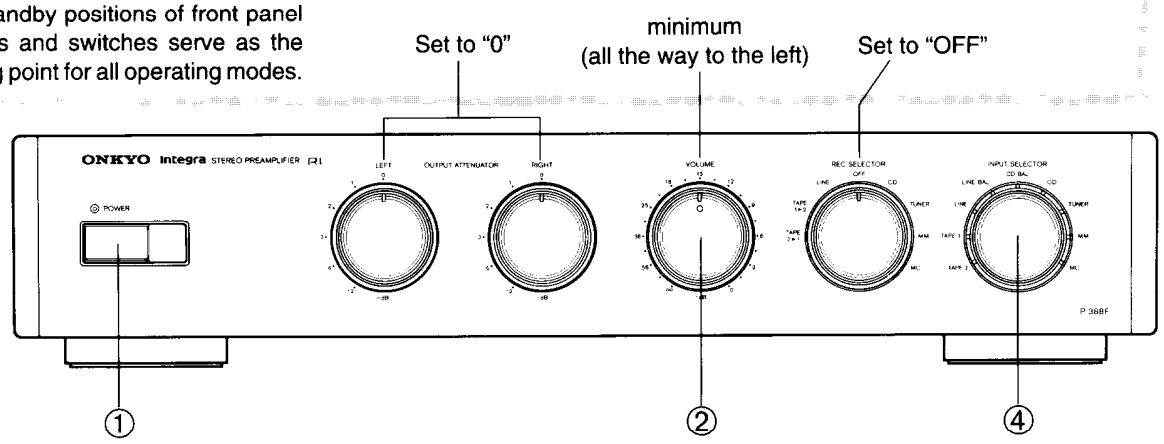
NOTE:

Remote control operation is not possible when only the remote control cable is connected. Remote control cable and pin cord must be connected.

- Connect all components to the rear panel jacks as shown in the system connections section and set the front panel controls at the appropriate setting to hear the desired program source.

How to play

Normal Standby Mode
The standby positions of front panel controls and switches serve as the starting point for all operating modes.



① Press the power supply switch to turn the power on.
- The POWER indicator lights.

② Use the INPUT SELECTOR switch or remote control to select a source to be played.
- Make sure that the device of the selected source is connected to the appropriate position.

③ Begin play of the device.

④ Slowly turn the volume to set an appropriate volume value.

* If the volume is turned down too much, adjust the volume becomes difficult, and left and right volume balance will be lost. In this happens, make adjusting the volume easier by setting both the left and right of the OUTPUT ATTENUATOR switch to 6 or 12.

* When you are not recording or dubbing, set the REC SELECTOR switch to "OFF". Cutting off this unused circuit will give you better sound quality.

NOTES:

- This unit employs a microcomputer to perform various functions and operations. If interference generated by an external power supply, radio waves, or other electrical sources result in an accident which causes the specified operations and functions to operate abnormally. For example, if an input source is selected, using the Input Selector switch, but no input signal is received the Input Selector indicator will flash after 10 seconds. Disconnect the unit's power cord from the power source, leave for 5 to 15 seconds then re-connect the power cord.
- After the power supply is turned on, the unit cleans the contact point of the internal rotary selector for 4 seconds. Don't turn the power off during this period. Doing so may cause the input selector setting to change from its previous setting when the power supply is again turned on.

How to play equalizer

(When the graphic equalizer is connected to TAPE-1)

1 Use the REC SELECTOR switch to select the source you want to listen to.
- To listen to TAPE-2 set to "TAPE 2►1".

2 Set the INPUT SELECTOR switch to "TAPE-1".
(If the graphic equalizer is connected to TAPE-2 terminal, set to "TAPE-2".)

3 Operate the graphic equalizer.
(Refer to the instruction manual for the graphic equalizer.)

4 Begin play.

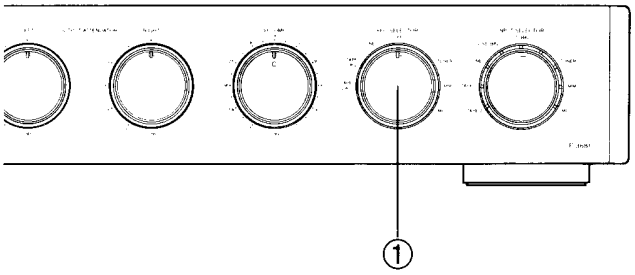
NOTE:

It is impossible to equalize the signal from the balance input terminal (BALANCED CD/LINE).

How to record /dub

- This unit enables recording regardless of the INPUT SELECTOR switch setting.
- Adjust the recording level on the deck side.

To record a desired source to DAT or tape deck:



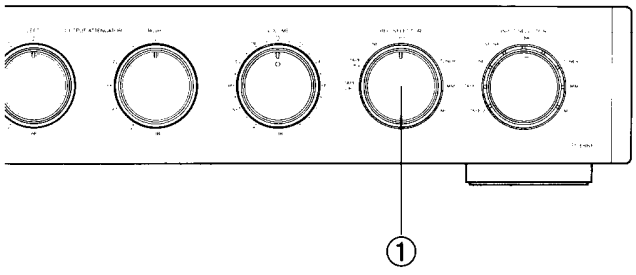
① Use the REC SELECTOR switch to select the source you want to record. (LINE, CD, TUNER, MM, MC)
② Operating the DAT or the tape deck begins recording.
③ Begin play of the program source.
- If you activate the INPUT SELECTOR switch, you can keep recording, while listening to another source.
- When using a 3-head type tape deck, monitor recording status by setting the INPUT SELECTOR switch to TAPE-1 or TAPE-2.
- When recording the sound processed by the graphic equalizer, use the equalizing recordable tape input terminal to connect to the graphic equalizer. Also, connect the tape deck to the tape terminal of the graphic equalizer. (refer to page 7)

NOTE:

It is impossible to record the signal from the balance input terminal (BALANCED CD/LINE).

How to do tape dubbing

Using two DATs or tape decks to record one tape to another tape is called "tape dubbing".



① Change the REC SELECTOR as follows depending on the direction of the dubbing.
- Dubbing from TAPE-1 to TAPE-2 ..... Set to TAPE 1►2.
- Dubbing from TAPE-2 to TAPE-1 ..... Set to TAPE 2►1.

② Start recording and playing.
- When using a 3-head type tape deck, you can monitor the recording status by setting the INPUT SELECTOR switch to TAPE-1 and TAPE-2.

Timer recording

The signal you select with the REC SELECTOR is output to the REC terminal of "TAPE-1" and "TAPE-2".
For timer recording, set the REC SELECTOR to the desired setting.

Achieve better recording by turning the volume of the unit to minimum, or setting the INPUT SELECTOR to another source.

NOTE:

Timer play
Make sure that the desired source can be heard, then set the time on standby.

Using the remote control transmitter RC-235S

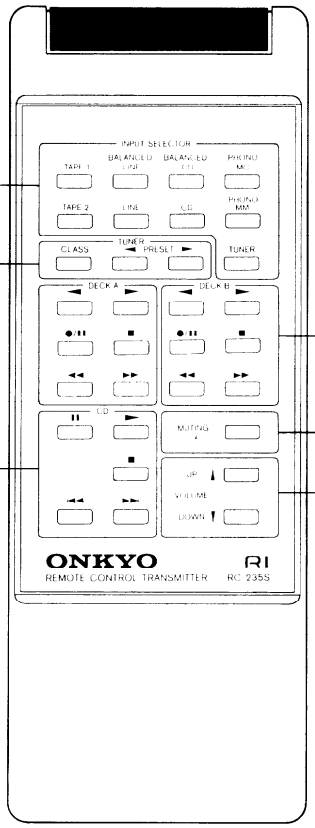
Explanations in italic explain which buttons to use when operating the unit. Explanations in standard type explain which buttons to use when operating ONKYO devices connected to the unit.

Input Selector Buttons (TAPE-1, TAPE-2, BALANCED LINE, LINE, BALANCED CD, CD, PHONO MC, PHONO MM, TUNER)

Tuner Operation Buttons (TUNER)
CLASS: Class selector button
◄PRESET►: Preset memory DOWN/UP buttons

CD Operation Buttons (CD)
These buttons are used to operate an ONKYO CD player with the RI mark.

- ❚❚ : Press this button to pause the CD play back.
  To resume disc play, press the PLAY (►) button.
- ► : Press this button to play the CD player.
- ■ : Press this button to stop the CD player.
- ⏮ : Press this button to go back to the beginning of the current track and again to skip back to the previous track.
- ⏭ : Press this button to skip to the next track.



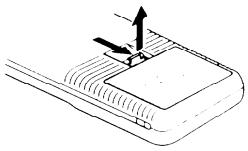
Tape Operation Buttons (DECK-A, DECK-B)
These buttons control ONKYO double cassette tape decks that can be remote controlled. Use the DECK-B buttons to control single cassette tape decks with the RI mark.

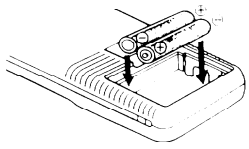
- ◄ : The tape plays, moving from right to left, or, in the recording stand-by mode, recording begins.
- ► : The tape plays, moving from left to right, or, in the recording stand-by mode, recording begins.
- ●/❚❚: When this is pressed, the recording stand-by mode is entered.
- ■ : Interrupts all operations.
- ◄◄ : Fast forward from right to left.
- ►► : Fast forward from left to right.

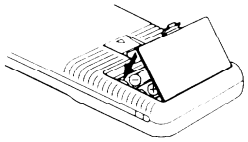
Audio Muting Button (MUTING - ∞)
This button temporarily switches off the sound from the speaker or headphone. Pressing the button again or using the POWER button to turn the power on will turn off the audio muting. This function can only be controlled by the remote control transmitter.

Volume Buttons (UP, DOWN)

Transmitter Battery Insertion

1 
Open the battery cover, pressing the projection in the direction of the arrows as shown in the figure.

2 
Insert the batteries, making sure that the polarity is correct.

3 
Reinstall the battery cover.

Precautions when using batteries

- The remote control transmitter is powered by two batteries. Before using this unit for the first time, insert the two batteries (included) as shown in the diagram.
- Average battery life is about one year. This period may be shorter depending on the frequency of use and environment (temperature and humidity) in which the remote control transmitter is used.
- If the remote control transmitter does not operate even though front panel controls function normally, the batteries should be replaced. Use only batteries listed in the following chart.

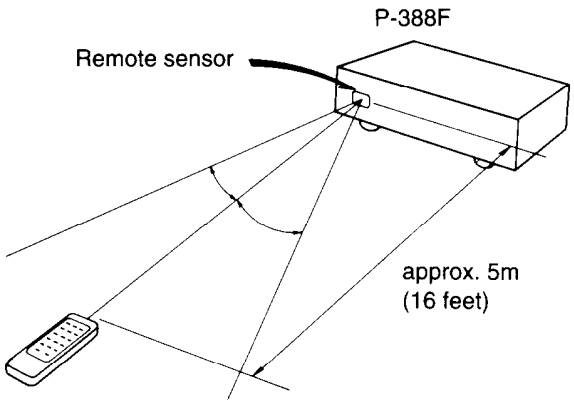
Type	Voltage	Size
Manganese	1.5V	AA R6 UM-3

NOTES:

1. Do not leave an expired battery in the case as it may leak or damage the battery case.
2. When inserting the batteries, be sure the (+) and (–) ends are properly aligned.
3. Do not use nickel-cadmium (rechargeable) batteries.
4. Do not use one specified (manganese) battery and one alkaline Battery at the same time.
5. Replace both batteries at once; do not use one old and one new battery together.

Using the remote control transmitter

1. Remove the batteries if the remote control transmitter is not going to be used for a long time.
2. The batteries of the remote control transmitter must be replaced periodically.
3. This unit uses infrared rays. Therefore, commands may not be received properly if the front panel of this unit is exposed to bright light. To prevent this from occurring, place this unit so that it is not directly exposed to bright light.
4. If this unit is placed inside an audio rack behind a glass door, the door should not have colored glass or have any decorations on it, since this could shorten the range or prevent commands from being received.
5. Use of other infrared remote control devices in the same room may cause interference.
6. The transmitter operates up to a distance of about five meters (16 feet). The transmitting window must always be pointed at the reception window when a command is sent to the P-388F.
7. If this remote control transmitter does not operate properly, confirm that the batteries are not dead. If the problem persists, contact your ONKYO Service Center.



Remote control transmitter

Troubleshooting guide

Trouble	Cause	Remedy
No power.	• The power cord is not plugged in. • AC fuse blown.	• Plug in the power cord. • Contact your authorized ONKYO service center.
Power on but no sound.	• Bad connections.	• Check input leads, pin plugs, etc.
Hum, low frequency noise.	• Poor or no input ground. • Poor or no phono motor ground.	• Check outer conductor of input plugs. • Check for proper ground connection.
Howling when the volume is turned up.	• Turntable and speakers are too close together.	• Move them farther apart.
Rough or scratchy sound. High range is not clear.	• Stylus of pick-up is worn. • Stylus is dirty.	• Replace. • Clean.
Front panel controls function but remote control transmitter does not.	• No batteries in remote control transmitter. • Batteries have worn out.	• Insert batteries. • Replace batteries.
The unit does not function properly, or does not work at all.	• Malfunction of the microcomputer.	• Turn off the power supply, then turn it on again.

Specifications

Input Sensitivity and Impedance:
- PHONO MC: 160 μV 100 ohms
- PHONO MM: 2.5 mV 47 kohms
- BALANCED: 150 mV 30 kohms (Hot-Cold)
- UNBALANCED: 150 mV 15 kohms

Rated Output and Impedance:
- BALANCED: 1.0V 200 ohms
- UNBALANCED: 0.5V 100 ohms
- TAPE REC: 150mV 1.1 kohms

Maximum Output:
- BALANCED: 10.0V
- UNBALANCED: 5.0V
- TAPE REC: 12.0V at Phono Input

RIAA Deviation: ± 0.2dB at 20-20,000 Hz

Phono Overload:
- PHONO MC: 13 mV RMS at 1kHz, THD 0.05%
- PHONO MM: 200 mV RMS at 1kHz, THD 0.05%

Frequency Response (CD):
- Balanced/Unbalanced +0, –3 dB at 0.8 Hz – 170 kHz

Total Harmonic Distortion:
- PHONO MC: 0.005% at 3V OUTPUT
- PNONO MM: 0.0008% at 3V OUTPUT
- CD (BAL, UNBAL): 0.0005% at 3V OUTPUT

Intermodulation Distortion:
- CD (BAL, UNBAL): 0.003% at 70 Hz : 7kHz=4 : 1

Signal-to-Noise Ratio:
- PHONO MC: 81 dB (0.5 mV Input A-Weighted)
- PHONO MM: 92 dB (5.0 mV Input A-Weighted)
- CD (BAL, UNBAL): 105 dB (150 mV Input A-Weighted) at Balanced Output

Power Supply:
- USA & Canadian models: AC120V, 60 Hz
- Worldwide models: AC120V, 60 Hz or AC220V, 50 Hz (switchable)

Controls: POWER
OUTPUT ATTENUATOR (L, R), (0, –1, –2, –3, –6, –12dB)
VOLUME
REC. SELECTOR (MM, MC, TUNER, CD, LINE, TAPE1 ► 2, TAPE2 ► 1)
INPUT SELECTOR (MM, MC, TUNER, CD, CD-BAL, LINE-BAL, LINE, TAPE-1, TAPE-2)
OUTPUT MUTING (-∞) (Remote Control only)

Inputs: MC (PHONO), MM (PHONO), TUNER, CD, CD-BAL (BALANCED)
LINE-BAL (BALANCED), LINE, TAPE-1, TAPE-2

Outputs: TAPE REC OUT TAPE-1 & 2
OUTPUT BALANCED
UNBALANCED NORMAL & INVERT

Dimensions: 455 (W) × 90 (H) × 418 (D)
17-15/16" (W) × 3-9/16" (H) × 16-7/16" (D)
(side panels included) 475 (W) × 90 (H) × 418 (D)
18-11/16" (W) × 3-9/16" (H) × 16-7/16" (D)

Weight: 8.9 kg, (19.6 lbs.)
(side panels included) 9.2 kg (20.3 lbs.)

Specifications and features are subject to change without notice.